

participation and involvement was encouraged among the different members. Members of other organizations working with children heard about the network and asked to be allowed to present their programs; among them were special education staff and drug prevention specialists.

Another important factor in maintaining a high level of support and participation was flexibility in determining the course of the network. At first the group followed the original agenda with presentations by the various agencies, each outlining their specific programs and objectives. As the members became more familiar with each other and their programs, the network began to focus on specific issues. Letters that were the result of input and support from the various agency representatives were sent to administrators or county supervisors regarding funding cuts or the need for services in the district.

The plan was to evaluate the purpose and effectiveness of the network after 1 year. At the last meeting of the school year, the members voiced a need to become more action-oriented, to address and attend to specific pressing issues, and to move away from the idea of a general get-together luncheon. The members voted to continue the network in the following school year, 1989-90.

Recognition

The Klamath-Trinity Interagency Network and the three coordinators were recognized in June 1989 for their efforts to serve the children and residents of the rural district. A certificate of recognition was presented at a prevention celebration sponsored by the Humboldt County Office of Education, College of the Redwoods, Humboldt County Drug-Free Schools Consortium, Juvenile Justice and Delinquency Prevention Commissions, and the Kingsview-Humboldt Alcohol and Drug Program.

Conclusion

The function of a networking agency has been described as a "commitment to the tasks . . . rather than to any formal organization structure" (8). The aim is to become a forum for interagency cooperation, a means of coordinating community response. Particularly in developing strategies to aid the at-risk children, the network needs to be flexible and ever evolving.

The intent of a multidisciplinary approach in preventing child abuse is to keep constant a high level of care in the community. In rural districts, the obstacles of distance and limited resources make it essential to develop a community network of the many professionals serving the area. The network's ultimate goal would encompass both early identification of risk groups and integrated services to provide the most effective strategies in coping with the issue at hand.

References

1. Christensen, M. L., Schommer, B., and Velasquez, J.: Pt. 1: An interdisciplinary approach to preventing child abuse. *Matern Child Nurs J* 9: 108-112 (1984).
2. Crime Prevention Center: Child abuse prevention handbook. Office of the Attorney General, Sacramento, CA, 1985.
3. Schmitt, B. D.: The prevention of child abuse and neglect: a review of the literature with recommendations for application. *Child Abuse Negl* 4: 171-177 (1980).
4. Saunders, E., and Goodall, K.: A social services-public health partnership in child protection: a rural model. *Public Health Rep* 100: 663-666, November-December 1985.
5. Cutler, D., and Madore, E.: Community-family network therapy in a rural setting. *Community Ment Health J* 12: 144-155 (1980).
6. McLemore, M.: Nurses as health planners. *J Nurs Adm* 1: 13-17 (1980).
7. Reder, P.: Multi-agency family systems. *J Fam Ther* 8: 139-152 (1986).
8. Barber, J. H., and Kratz, C., editors: *Towards team care*. Churchill Livingstone, New York, 1980.

Household Survey of Child-Safe Packaging for Medications

JAMA A. GULOID, PhD, MPH
RONALD S. HADSALL, PhD
JEFFREY J. SACKS, MD, MPH
ALBERT I. WERTHEIMER, PhD

Dr. Gulaid and Dr. Sacks are both with the Division of Injury Epidemiology and Control, Centers for Disease Control, Public Health Service. Dr. Hadsall is an Associate Professor in the Graduate Program in Social Administrative Pharmacy at the University of Min-

nesota in Minneapolis. Dr. Wertheimer is a Professor and Director of the Pharmacy Graduate Program at Minnesota.

Dr. Paul Gunderson and Carol Vergas of the Minnesota Department of Health provided assistance with sampling. This project was supported in part by funds from the Minnesota Poison Control System.

Tearsheet requests to Jeffrey J. Sacks, MD, MPH, Division of Injury Epidemiology and Control, Mail Stop F-36, Centers for Disease Control, 1600 Clifton Road, NE, Atlanta, GA 30333.

Synopsis

In an investigation of the prevalence of safety packaging of medications, 131 randomly selected Min-

neapolis and St. Paul households with children were surveyed in 1985. Of the 1,953 oral medications in these households (mean was 14.9 per home), 43.3 percent did not have safety packaging. Over-the-counter medications were less likely to have safety packaging than prescription medications (over-the-counter 53.1

percent, prescription 25 percent).

This high prevalence of medications without safety packaging in households with children could increase the risk of childhood poisoning. Strategies to reduce this potential risk are discussed.

In 1983 in the United States, 55 children less than 5 years old died from poisoning, 20,000 were hospitalized, and approximately 1.4 million ingested potentially poisonous substances (1-3). More than 60 percent of the poison-related deaths and 40 percent of all poison ingestions reported to poison control centers were attributable to medications (1, 4). One reason that children can gain access to medications may be the lack of safety packaging. This report describes the findings of a cross-sectional study of the prevalence of safety packaging of medication containers in homes with children.

Methods

In February 1985, we randomly selected 600 (2.2 percent) of 27,857 births between March 1979 and February 1984 in Minneapolis and St. Paul, MN. Eligible subjects were restricted to legitimately born white children still residing in either city as determined by telephone and city directories. Of the 600 selected children, 367 met the criteria. Because of limited resources, 221 (60 percent) were randomly chosen for study.

One week after we sent a letter explaining the study, we called each household to confirm the family name and solicit participation. One of four staff members visited each participating household between September and December 1985 and recorded the medications and type of packaging, as well as limited demographic data on a standard form.

Medications were classified into three categories: (a) prescription medication (Rx) if the container label showed the names of the patient and the physician, (b) nonprescription medication (OTC) if the container had a manufacturer's label only, and (c) "other" medication if it did not belong to the Rx or OTC category. Medication not intended for oral ingestion, such as topicals, sprays, and eye and nose drops were excluded from the study.

A medication container was defined as safety packaging if the manufacturer's instructions indicated "child-resistant," "press-n-turn," "push-n-turn," "line up arrows," or it had a reversible cap used in the child-resistant position. A container was defined as without safety packaging if the instructions indicated

"nonchild-resistant," or the container had a regular screw top that required several turns in a counterclockwise direction to loosen or remove it, had a flip top that could be removed with pressure from the thumb, or had a reversible cap in the nonchild-resistant position. Containers different than the types described were defined as "other."

Evaluators were trained with containers of different sizes, designs, and conditions to minimize misclassification. After recording the type of medication, packaging, and condition of the packaging (open, partially open, or secure), each evaluator's observations were compared with those of the principal investigator. By the end of training, these two sets of observations agreed 97 percent of the time. No further validation was done.

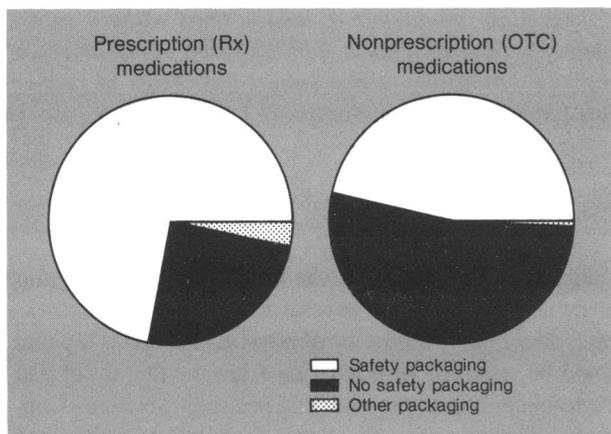
Results

Of the 221 households contacted, families in 135 (61 percent) agreed to participate, 39 (18 percent) refused, and 47 (21 percent) could not be reached. After 4 of the 135 households were excluded because of incomplete data, there were 131 households left for the analysis.

The median number of residents per home was 4, with a range of 2-12. There was a total of 245 children under the age of 6; 13 percent were infants; the remainder were roughly divided equally by age. Of persons over 19 years of age, 65.2 percent were between 30 and 39 years old. In only one home was there a head of household (HOH) who had not completed high school; in 45.2 percent of homes the HOH had completed college and in another 28.2 percent the HOH had attended college.

There were 1,953 medication containers in these homes; 1,318 (67.5 percent) were classified as Rx; 576 (29.5 percent) as OTC; and 59 (3 percent) as other. On average, each household had about 15 medications, of which 10.1 were Rx, 4.4 were OTC, and 0.5 were other. Of the 1,894 Rx or OTC medications, 790 (41.7 percent) were stored in the kitchen, 630 (33.3 percent) in the bathroom, 120 (6.3 percent) in the bedroom, and 354 (18.7 percent) in other locations. Six of 1,953 medication containers had been left open or partially open.

Container packaging by medication type, Minneapolis–St. Paul, 1985



Of the 1,318 Rx medications, 330 (25 percent) were in containers without safety packaging; for 576 OTC medications, 306 (53.1 percent) were without safety packaging (see figure). Types of packaging designated as other accounted for only a small percentage of Rx and OTC medications. Overall, 43.3 percent of all medications were in containers without safety packaging.

Discussion

Our data show a 43-percent prevalence of medications without safety packaging in households with children. Our findings should be interpreted cautiously and may not be generalizable because of a 39-percent non-participation rate, the urban setting of the study, and the restriction of the study population to white children. Moreover, the home visits were not surprise visits; there may have been some alteration of the environment prior to our evaluation. Nevertheless, finding an average of almost 15 medications per home and such a high prevalence of them without safety packaging suggests that even these relatively well-educated parents need information on the benefits of safety packaging and on the wisdom of throwing away old medicines.

Although the passage of the Poison Prevention Packaging Act (PPPA) in 1973 has been credited with a decline in poisonings (5), the PPPA does permit the use of containers without safety packaging for some prescription medications, such as antibiotics or nitroglycerin (6). The act also permits the sale of some OTC medications without safety packaging. In addition, it allows manufacturers not to use safety packaging for one size container for each regulated OTC medication.

There are other times safety packaging may not be used. For example, a patient may ask a physician or pharmacist not to use safety packaging; or a pharmacist,

in violation of the PPPA, may dispense regulated medications without safety packaging (7). Even when a medication has safety packaging, it may not be effective because of liquid buildup on threads or wear associated with use (8, 9). Indeed, in one study of unintended oral ingestion of prescription drugs by children under 5 years of age reported to poison control centers, 61 percent of the medications had no child-resistant barrier at the time of ingestion, and of the 31 percent of the child-resistant containers available for study, 65 percent were not functioning properly (9).

Safety caps are not child-proof, but simply are intended to slow down a child's access to the medicine and allow time for a guardian to discover the situation. Because containers without safety packaging allow children easier access to contents than do containers with safety packaging, the widespread use of containers without safety packaging, coupled with unsafe storage practices and inadequate supervision, could increase the risk that children will ingest potentially poisonous medications.

We recommend better education of parents and others likely to be in contact with children about the benefits of safety packaging. It should also be pointed out that no type of safety packaging supplants parental vigilance and safe storage practices such as locking medications up or placing them out of a child's potential reach. Pharmacists should use and encourage the use of safety packaging. New, improved generations of safety packaging should be developed and their effectiveness and consumer acceptance should be evaluated.

References

1. Accident facts 1985. National Safety Council, Chicago, 1985.
2. Rodriguez, J. G., and Sattin, R. W.: Epidemiology of childhood poisonings leading to hospitalizations in the United States, 1979-1983. *Am J Preventive Med* 3: 164-170 (1987).
3. Veltri, J. C., and Litovitz, T. L.: 1983 annual report of the American Association of Poison Control Centers National Data Collection System. *Am J Emergency Med* 2: 420-443 (1984).
4. Poisoning among young children-United States. *MMWR* 33: 129-131 Mar. 16, 1984.
5. Walton, W. W.: An evaluation of the poison prevention packaging act. *Pediatrics* 69: 363-370 (1982).
6. Poison prevention packaging act of 1970 regulations. (16 CFR ch II 1-1-86 edition. U.S. Government Printing Office, Washington, DC, 622-160/00275 (1986).
7. Dole, E. J., Czajka, P. A., and Rivara, F. P.: Evaluation of pharmacists' compliance with the Poison Prevention Packaging Act. *Am J Public Health* 76: 1335-1336 (1986).
8. Unintentional ingestions of prescription drugs in children under five years old. *MMWR* 36: 124-126, 131-132 Mar. 13, 1987.
9. Jacobsen, B. J., Rock, A. R., Cohn, M. S., and Litovitz, T.: Accidental ingestions of oral prescription drugs: a multicenter survey. *Am J Public Health* 79: 853-856 (1989).